IOP Conference Series: Earth and Environmental Science 2018 vol.155 N1

Perspective usage estimation of Volga region combustible shale as a power generating fuel alternative

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2018 Institute of Physics Publishing. All rights reserved. A comprehensive study of combustible shale, common within Tatarstan and Ulyanovsk region, is carried out. The rocks physicochemical parameters are found to meet the power generating fuels requirements. The predictive estimate of ash products properties of combustible shale burning is held. Minding furnace process technology it is necessary to know mineral and organic components behavior when combustible shale is burnt. Since the first will determine slagging properties of energy raw materials, the second - its calorific value. In consideration of this the main research methods were X-ray, thermal and X-ray fluorescence analyses. Summing up the obtained results, we can draw to the following conclusions: 1. The combustible shale in Tatarstan and the Ulyanovsk region has predominantly low calorific value (Qbd= 5-9 MJ/kg). In order to enhance its efficiency and to reduce cost it is possible to conduct rocks burning together with some other organic or organic mineral power generating fuels. 2. High ash content (Ad= 60-80%) that causes a high external ballast content in shale implies the appropriateness of using this fuel resource next to its exploitation site. The acceptable distance to a consumer will reduce unproductive transportation charges for large ash and moisture masses. 3. The performed fuel ash components characteristics, as well as the yield and volatiles composition allow us to specify the basic parameters for boiler units, designed for the Volga combustible shale burning. 4. The noncombustible residual components composition shows that shale ash can be used in manufacture of materials of construction.

http://dx.doi.org/10.1088/1755-1315/155/1/012011

References

[1] Emeshev V. G. and Parovinchak M. S. 2005 Without imported energy Oil and gas vertical 17 63-65

[2] Cherdyntsev V. A. and Tikhvin E. I. 1939 The geology of the Tatar ASSR and neighborhood within 109 sheet (Moscow: Publishing house «GONTI") 204

[3] GOST 25100-95 Soils. Classification. Russia - ref-separator -

[4] Topor N. D., Ogorodova L. P. and Mel'chakova L. V. 1987 Thermal analysis of minerals and inorganic compounds (Moscow: MSU Publishing house) 190

[5] Ivanov V. P., Kasatov B. K., Krasavina T. N. and Rozinova E. L. 1974 Thermal analysis of minerals and rocks (St. Petersburg: Publishing house «Nedra") 399

[6] Abrutin A. A. and Karasina E. S. 1998 Thermal design of boilers (normative method) (St. Petersburg: Publishing house of NPO CKTI) 256